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Acute Coronary Syndromes

SPECKLE TRACKING IS A ROBUST METHOD TO EVALUATE DYNAMIC FUNCTION OF THE HEART: AN IN-VITRO MODEL STUDY

Poster Contributions
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Session Title: Fundamental Observations from Clincial Practice in ACS
Abstract Category: 1. Acute Coronary Syndromes: Basic
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Background: Myocardial ischemia results in abnormal dynamic cardiac function. We evaluated whether this semi-automated method is able to objectively quantify cardiac function in a model of ischemic damage.

Methods: We studied 5 freshly harvested pig hearts. Each heart was mounted in a water bath and each ventricle was attached to a separate pulsatile pump through latex balloons with fixed volumes of water. Pulsatile flow into the ventricles was generated simultaneously by delivering 6 different calibrated stroke volumes (SV) (15-40 ml) at a constant rate of 60 beats/min. Cardiac motion was scanned with a 10 MHz sector probe to acquire short axis views on a GE Vivid7 Dimension ultrasound system. 2D scanline images were acquired at frame rates of 80-100fps. After baseline, 1-2ml of glutaraldehyde were injected into the LV free wall to simulate myocardial infarction. The study was repeated at the same SVs. Images were exported to EchoPac PC for offline analysis of circumferential and radial strain by speckle tracking based methods.

Results: With increased SV, a corresponding increase in circumferential strain was detected (r=0.85). After simulated myocardial infarction, significantly lower circumferential strain was detected in the region of interest at all SVs (r=0.79).

Conclusion: Speckle tracking provides an objective evaluation of heart function, and detects the decreased veloc ties in the “infarcted” region with high reproducibility.